



FALL
2003

ENVIRONMENTAL BULLETIN

A Maine DEP Informational Bulletin for Maine Citizens & School Officials



EPA praises Maine school officials for reducing diesel bus emissions

School bus exhaust linked to asthma in children

U.S. Environmental Protection Agency Administrator Christie Whitman visited the Howard C. Reiche Elementary School in Portland to promote reduction of diesel exhaust from the nation's school buses. Reducing school bus exhaust has become a local and national priority after a series of studies found the emissions contribute to lung damage, respiratory problems, and even premature death.

Whitman praised the Portland School Department for its leadership in Maine to protect school children from bus emissions, that contribute to Maine's high rates of asthma and other health problems. "We know they're the safest way to get kids to school. We believe they can be a whole lot healthier, as well," she said.

EPA challenges school districts to reduce idling of parked buses. The goal nationwide is to reduce the average amount of time each school bus idles from an hour to 30 minutes a day by 2005, Whitman said. "that would save 17 million gallons of fuel a year in addition to cleaning the air."

As Director of Transportation for the Portland School Department, Kevin Mallory led the charge in Maine by implementing a no-idling guideline early in 2002. "The Portland School District also uses scheduling and routing software to keep buses moving efficiently," Mallory said.

Across the state, school bus drivers are required by their districts to turn off their engines unless it's 20 degrees or colder outside. In addition, drivers are not allowed to idle their engines while parked in front of schools. According to Mallory, "We want to



EPA Administrator visits Portland's Reiche Elementary School.

"We want to be on the leading edge when it comes to protecting our students and citizens from harmful pollutants"

be on the leading edge when it comes to protecting our students and citizens from harmful pollutants".

The City of Portland has also invested aggressively in newer buses. Whitman praised Maine's school transportation directors for reducing idling time and encouraged more school districts to follow Portland's lead in converting their bus fleet into newer and cleaner transportation.

Inside: recommendations from the Maine Departments of Education and Environmental Protection and Maine Association for Pupil Transportation.



Recommendations to reduce diesel exhaust

- * Prevent or reduce bus idling whenever practical in the schoolyard and at cold start-up.
- * Require routine maintenance to keep buses running smoothly with no leakage of fumes into seating areas.
- * Examine the duration of rides and take appropriate steps to minimize length of routes where possible.
- * Reevaluate location of bus parking lots, avoiding close proximity to areas where fumes can become trapped or enter buildings.
- * Purchase buses with low emission engines and use ultra-low sulfur diesel fuel.

What are other Maine schools doing?

Riding the bus is an extremely safe way to go to and from school. However, school officials want to further protect student health by reducing exposure to harmful exhaust emissions. Diesel exhaust from idling school buses can accumulate in and around the bus. Cutting school bus idling time is easy to do and is good for the air and for the health of children and drivers. It also saves school budget dollars; every hour of idling wastes one gallon of fuel. Some schools have invested in signs for the bus loading areas, like this one at the James Bean School in Sidney, that reminds drivers of their no-idling policy.

In SAD 47, Messalonskee Transportation Director Lennie Goff has found school bus routing software very useful in limiting student time on the bus. It has even saved his district the cost of adding an additional bus and driver to address student transportation needs.



Goff purchased *Versa Trans* software which helped him instead, to identify a way to add a bus route in Sidney and redefine an existing route in Oakland. The software Goff used factors in student locations, speed limits and number of stops and determines the most efficient routes. It also provides additional information on mileage, time and safety issues.

The cost of this type of software is usually based on student population. Although it may seem expensive, in Goff's case the *cost savings* was very significant without adding an additional bus and driver to his fleet.

ASSESSING YOUR FLEET



- * Older technology buses can produce as much as six times the pollution as a new school bus. Pre-1990 schoolbuses make up about 1/3 of local fleets, are the heaviest polluters and EPA recommends they be replaced wherever possible. Buses manufactured between 1990 and 2003 can also be made much cleaner by retrofitting with devices designed to reduce pollution.
- * Evaluate which buses to retire and replace with cleaner running engines. Identify which could be retrofitted with advanced emission control technology. Research the options and costs for retrofitting buses that can't be replaced any time soon.

(See www.epa.gov/otaq/retrofit/retroverifiedlist.htm for retrofit equipment information.)

Getting Biodiesel on the Bus...



Students in the Waynflete School Environmental Activist Club wanted to raise awareness about using biodiesel to reduce diesel bus pollution. They contacted biodiesel distributors in Maine and learned that storage and distribution was an issue. Finding enough customers willing to use biodiesel to get lower prices through bulk ordering is also an issue of concern. The students contacted a variety of businesses with diesel fleets in the Portland area and several expressed an interest in using the fuel if a storage facility could be found; but were still somewhat concerned about the extra cost.

The students raised money to cover the cost difference; then convinced Waynflete's Transportation Director Mark Bennett to conduct a pilot study using biodiesel. During the month of May, the designated Bus (#16) purchased 50 gallons of biodiesel. "The nearest biodiesel filling station was located 20 miles from the school in Arundel" says Bennett. "To avoid making special trips to fuel up, we planned to leave sufficient room to take on 15 to 18 gallons of fuel during three sports trips to places near the biodiesel refueling station – minimizing extra mileage."



Doing Our Share For Clean Air

Bennett reports he "had the driver 'splash blend' the fuel in the bus tank, by adding biodiesel on top of ordinary diesel fuel. Adding 15 gallons of biodiesel to a 55 gallon tank, means that the biodiesel blends started out at 30% or more. As a precaution, the engine's fuel filter was changed during its regularly scheduled oil change after the first blended tank had been nearly consumed. This ensured that the fuel filter didn't become clogged due to the biodiesel fuel which can act as a solvent and loosen debris in the fuel line."

Bennett says, "the experiment was a success for Waynflete because we contributed smaller amounts of noxious emissions while using the biodiesel blend, and we observed no negatives in performance or mileage economy whatsoever. Now we know from personal experience that biodiesel is a viable alternative fuel." He'd like to be able to use it regularly if they can find a storage facility nearby.

No-Idling Tips

Turn off school bus engines when buses arrive at their destinations, particularly on school grounds.

Do not restart buses until departure.

At school bus depots, try to limit the idling time during early morning warm-up to what is recommended by the manufacturer - generally 3-5 minutes.

In colder months, block heaters, which plug into electrical outlets or 'webasto-type' heaters installed in the bus can help warm the engine to avoid starting difficulties and shorten warm-up time.

If buses need the engine to run flashing lights, consider changing the circuit configurations so that the lights can be powered by the battery without the engine running.

In winter, provide an indoor space where drivers who arrive early can wait and keep warm.





Maine DEP is
raising awareness by:

- * providing educational tools for encouraging no-idling programs;
- * developing news bulletins for school officials & presenting and exhibiting at school conferences;
- * compiling information on costs and benefits of alternative fuels;
- * supporting infrastructure development & bulk purchase cooperatives;
- * seeking grant funding for demonstration retrofit projects.



Contact Lynne Cayting
at Maine DEP
for more information
at 287-2437.

What is government doing?

The U.S. Environmental Protection Agency (EPA) and the New England states are taking steps to advance cleaner diesel engine technology. New standards for cleaner engines and ultra low sulfur diesel fuel are in place that will transform diesel fleets over the next decade.



CLEAN SCHOOL BUS USA

The U. S. EPA recently announced a national initiative to reduce children's exposure to the harmful effects of diesel exhaust from school buses. Congress has funded a five million dollar grant program. EPA is offering up to 20 grants to help school districts nationwide replace older buses or retrofit buses with pollution control equipment that reduces diesel emissions. "This money will help us kick-start the upgrading of our nation's school bus fleet so that millions of children can ride on cleaner buses," stated EPA Administrator Whitman.

In addition, the Maine DEP, in partnership with the Department of Education and Asthma Regional Council plans to apply for a grant to conduct a *demonstration project*, to retrofit some 1995 and newer school buses with diesel oxidation catalysts.

EPA-certified diesel oxidation catalysts are pollution control devices that can be retrofitted to the muffler. Maine DEP encourages school districts to consider having diesel oxidation catalysts installed as original equipment when purchasing new buses. Also, since the average age of Maine's school bus fleet is 15 years, buying new buses (with cleaner technology) prior to 2007 when new buses will be required to meet more stringent diesel emission standards; would go a long way towards cleaner air.

Retrofits for cleaner buses

A retrofitted school bus is a cleaner school bus. It is cleaner because it either has been fitted with a device designed to reduce pollution and/or it uses a cleaner fuel. There are a variety of ways to retrofit a school bus. Retrofit options range in cost as well as effectiveness and some come with special requirements. EPA verifies retrofit technology and certifies cleaner fuels to ensure that they produce the emission reductions advertised by their manufacturer.

Diesel oxidation catalysts



Diesel retrofit devices are similar in appearance to mufflers. A typical diesel oxidation catalyst is a stainless steel canister installed in the exhaust system much like a muffler. The canister contains a honeycomb-shaped substrate coated with catalytic metals such as platinum or palladium. The canister does not have moving parts. As exhaust gases pass through the honeycomb structure, pollutants and particulate matter are chemically oxidized to water vapor and carbon dioxide. Diesel oxidation catalysts can be used with existing highway diesel fuel. They are available for all engines and applications.

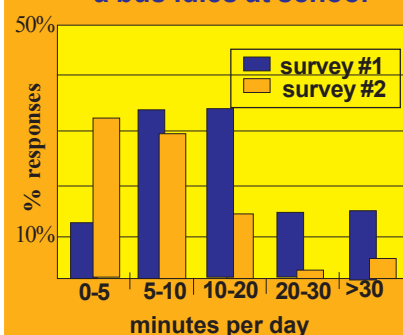
Diesel Oxidation catalysts are very effective:

- According to EPA, diesel oxidation catalysts can reduce particulate matter emissions by 20 to 30 percent, toxic hydrocarbon emissions by more than 50 percent, and carbon monoxide by more than 40 percent.
- Installing retrofit devices can also significantly reduce the smoke and odor from diesel engines. In many cases, these devices can significantly improve the work environment of bus drivers and students.
- Caterpillar has installed diesel oxidation catalysts on their engines as standard equipment since 2001, in order to meet federal emission standards. It is important to note that if the DOCs are removed from post-01 Caterpillar exhaust systems and not replaced it is a problem and can be considered illegal tampering.

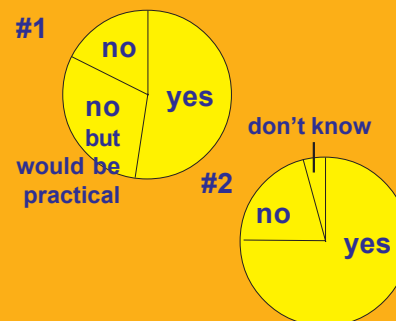
Maine DEP's Idling Survey Results

At the July MAPT meeting and again in a fall mailing to Transportation Directors (TDs), Maine DEP surveyed bus drivers and transportation directors to get a picture of school bus idling habits in Maine.

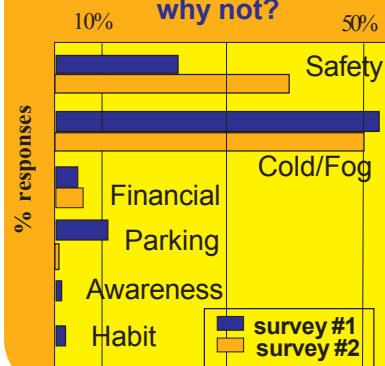
Estimated time a bus idles at school

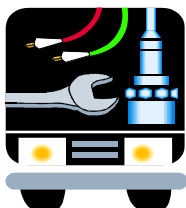


Does your school have no-idling guidelines?

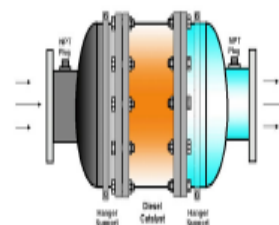


If no-idling isn't practical, why not?





QUESTIONS & ANSWERS about Diesel Oxidation Catalysts



How does a retrofit device work?

- A retrofit device reduces emissions by treating engine exhaust. As part of the exhaust system, the retrofit device breaks down or captures pollutants before they leave the tailpipe.

How much does a DOC cost?

- DOCs for school buses cost about \$1,000 - \$2,000. Cost is somewhat dependent on the age of the vehicle, the condition of other exhaust system components, and, whether the exhaust system is a rear exhaust or side exhaust system. Caterpillar engines we use in some school buses come standard with the DOC and have since 2001.

What type of fuel does a DOC require?

- DOCs can be used with regular diesel fuel.
- The effectiveness of a DOC may be increased with the use of *ultra low sulfur diesel* (ULSD). ULSD will be available nationwide beginning in June 2006.

Are there special maintenance requirements for a DOC?

- No. Much like a catalytic converter on a car, once a DOC is installed, it rarely requires maintenance. It is important to note that if the DOCs are removed from post-01 Caterpillar exhaust systems and not replaced it is a problem and considered illegal tampering.

How long does a DOC last?

- Most DOCs come with a 100,000 to 150,000 mile warrantee. They can last 15 years.

Where can I get a DOC?

- For more information about manufacturers of DOCs or other retrofit equipment visit: <http://www.epa.gov/otaq/retrofit/contretromfrs.htm>

Does the EPA verify these emission reductions?

- Yes. EPA verifies the performance of diesel retrofit devices to ensure the products perform as the manufacturer claims. EPA maintains a list of these technologies at www.epa.gov/otaq/retrofit/retroverifiedlist.htm.

Will using a verified retrofit device affect my base engine warranty?

- No. Manufacturers have said they will continue to honor base engine warranties if retrofit devices are sized, installed and maintained properly. Discuss this with your dealer just to be sure. Also, retrofit devices carry standard new-product warranties.

How do I install and maintain a retrofit device?

- Installation is similar to any other exhaust component replacement. The time involved depends on the age, design of the vehicle and the condition of its exhaust system. Field experience suggests it takes about 1 to 3 hours to install an oxidation catalyst.



Doing My Share for Clean Air - Honor Roll:

(Schools that have sent us copies of their Idling Policy.)



Portland Schools

Caribou School System



Falmouth Public School System

Westbrook School System



School Union 93, Blue Hill

MSAD # 6, Bonny Eagle

MSAD # 9, Farmington

MSAD # 17, Oxford Hills

MSAD # 41, Milo

MSAD # 45, Perham, Wade, Washburn



FROM OUR SURVEY RESULTS:

**More schools that have adopted or are adopting a No-Idling guideline
(but have not sent us a copy of the guideline yet):**

Augusta
Berwick
Ellsworth
Freeport
Harmony
Jackman
Jay
The Forks
New Gloucester
Orono

Raymond
Windham
MSAD #1 Presque Isle
MSAD #3 Unity
MSAD #4 Guilford
MSAD #11 Gardiner
MSAD # 12
MSAD #13 Bingham
MSAD #15
MSAD #27 Fort Kent
MSAD #28 Camden/Rockport

MSAD #30 Lee
MSAD #35 South Berwick
SAD #39 Buckfield
MSAD #42 Mars Hill
MSAD #43 Mexico
MSAD #47 Oakland
MSAD #48 Newport
MSAD #49 Fairfield
MSAD #57 Waterboro
MSAD #71 Kennebunk

MSAD #77 E. Machias
Union #30 Lisbon
Maine Indian Education-
Region 3, Princeton
Union #7 Saco/Dayton
N. Penobscot Tech
Region 3, Lincoln
CSD # 10 and Union #42,
Maranacook

***Congratulations to the Winner of Fall 2003 Survey Prize (\$50 LLBean gift certificate):
Mary Hawkes, Transportation Director of the Northern Penobscot Technical School, Region 3.***

More ideas from Transportation Directors for reducing diesel school bus emissions:

- The state should assist in providing money to completely replace older buses (built before 1993).
- Reposition the fleet to avoid exhaust emissions close to students.
- Require new buses to have emission control mufflers.
- Educate drivers and consistently remind them against prolonged idling.
- Have dismissal bells closer together so buses don't take as long to load.
- Post no idling signs in schoolyards.
- Add webasto-type heater to State bid specs.





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